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AUTHOR	Glick, Oren
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ABSTRACT

In this study, data were obtained from sixth grade students on attitudes toward each of four aspects of the school experience and on academic achievement. Data were available from 159 males and 199 females from 17 sixth grade classrooms in 17 schools within the Kansas City school district. Attitudes toward school were measured with the Pupil Opinion Questionnaire (POQ). Items were formulated on an a priori basis to tap three distinguishable components of school experience: (1) teachers, (2) school work, and (3) peers. A fourth component was labeled school in general. Academic achievement data consisted of grade equivalent scores averaged over the six components of the Stanford Achievement Test. Results include: (1) in the reciprocal effects between attitudes and achievement, achievement is much more frequently the causal factor but, except in the case of attitudes toward teachers, those effects are in an incongruent direction, and (2) among the four attitude objects, the preponderance of incongruent over congruent achievement was greatest in the case of attitude towards school work. One implication noted is that incongruent achievement influence on school orientations should be very infrequent in a "good" educational program. (Author/KJ)

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THE INTERDEPENDENCE OF SIXTH GRADERS' SCHOOL ATTITUDES AND ACADEMIC PERFORMANCE[1]

Oren Glick

The Olympic Center for Mental Health
and Mental Retardation
Bremerton, Washington

Do the attitudes toward school of the elementary school pupil affect his academic performance? Does his academic performance affect his school attitudes? Common sense would answer both questions affirmatively. Favorable orientations toward the school setting and activities within it should be reflected in learning tasks being approached and undertaken with relatively high interest and commitment, conditions contributing, one would expect, to academic success. In addition, success and failure are linked to a variety of positive and negative consequences respectively and may be expected to contribute, correspondingly, to favorable and unfavorable orientations toward school.

However, there is little supporting evidence at the elementary school level of the existence of such attitude-achievement relationships. Jackson (1968) reviewed studies by Malpass (1953), Tenenbaum (1944), Tschechtelin et al. (1940), Brodie (1964), Jackson and Getzels (1959), and his own investigations (Jackson, 1968) relating attitudes toward school to academic performance in the elementary school. Positive but near zero nonsignificant correlations between attitudes and either achievement test scores or teacher grades were generally reported. Six studies were reviewed involving more than 3,000 pupils, over 15 schools, several geographic areas, 5 different attitude instruments, and a time span of 25 years. Jackson concluded that "...the relationship between attitudes and scholastic achievement, if it exists at all, is not nearly as easy to demonstrate as common sense would lead us to believe it might be" (p.80).

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There is, furthermore, disagreement regarding the strategies by which implications of the attitude-achievement relationship, generally assumed to exist, might be translated into educational procedures. Learning technologists assert that if an instructional procedure is well designed and executed, in terms of the arrangements of stimulus-response elements, pupil attention and interest and consequent learning will automatically follow, with the resulting rewards producing favorable dispositions toward the learning task and situation. Design the instructional procedures correctly, it is claimed, and problems of pupil "attitudes" and "motivation" will take care of themselves as a function of successful learning. In contrast, educators with mental health and guidance backgrounds are likely to view preinstructional attitudinal and motivational dispositions as significant determinants of response to <u>any</u> instructional procedure and as relatively uncontrolled by the usual elements of instructional design. In this view, the dispositions themselves become primary targets for intervention and change. No direct evidence has been available to determine the relative merits of these two positions. Indeed, the current state of knowledge, indicated by Jackson's review, regarding any general attitude-academic performance relationship would appear to render <u>both</u> positions untenable, i.e., school attitudes and academic performance are unrelated at the elementary school level.

In the present study, data were obtained from 6th grade pupils on attitudes toward each of four aspects of the school experience and on academic achievement. The data were collected near the beginning and end of an academic year for purposes of evaluating a teacher training program in classroom mental health.[2] The questions here are: To what extent do school attitudes affect school achievement? To what extent does school achievement affect school attitudes? If both occur, which is preponderant? With data gathered on each variable at two points in time such questions can be approached by means of the cross-lagged panel correlation technique (Pelz and Andrews, 1964; Campbell, 1962; Campbell and Stanley, 1963. If attitudes affect achievement more than achievement affects

attitudes then, it is argued, the two cross-lagged correlations will compare as follows: $r_{att_1ach_2} > r_{ach_1att_2}$, where att and ach stand for attitudes and achievement respectively and 1 and 2 refer to time 1 and time 2. That is, achievement as an "effect" should correlate higher with a prior "cause" (attitudes at time 1) than with a subsequent "cause" (attitudes at time 2).

It has recently been noted (Yee and Gage, 1968; Rozelle and Campbell, 1969) that this formulation is an oversimplification. For the inequalities between $r_{att_1ach_2}$ and $r_{ach_1att_2}$ conceal four, rather than two hypotheses in competition. These are: (H_1) favorable school attitudes enhance achievement and unfavorable attitudes depress achievement or, (H_2) implausibly perhaps, favorable attitudes depress achievement and unfavorable attitudes enhance achievement. Similarly in the case of achievement influencing attitudes: (H_3, high achievement may enhance attitudes, low achievement depress attitudes or, (H_4) again perhaps implausibly, high achievement may depress attitudes and low achievement enhance attitudes.

In terms of these four alternatives, $r_{att_1ach_2} > r_{ach_1att_2}$ has ordinarily been interpreted merely as (H_1) > (H_3), (H_2) and (H_4) being disregarded or overlooked, in part because, on the face of it, they lack plausibility. Nevertheless, as the author's noted above show, $r_{att_1ach_2} > r_{ach_1att_2}$ involves a comparison between two joint effects, viz: (H_1) + (H_4) > (H_3) + (H_2). The present paper analyzes attitude and achievement data with respect to each of the four alternative hypotheses, portraying the correlational analyses in a manner suggested by Rozelle and Campbell but focusing on the "frequency of change in product moment" (FCP) proposed by Yee and Gage.

Method

Subjects

Data were available from 159 males and 199 females from 17 sixth grade classrooms in 17 schools within the Kansas City, Missouri Public School District.

Each school was from one of the three lowest levels of a 5 level socio-economic status (SES) classification of school neighborhoods.[3]

The POQ

Attitudes toward school were measured with the Pupil Opinion Questionnaire (POQ), a 60 item Likert scale constructed by the Kansas City School Behavior Project staff.[4] Items were formulated on an *a priori* basis to tap three distinguishable components of school experience: attitudes toward 1) teachers, 2) school work, and 3) peers. A fourth component consisted of a potpourri of items labeled "school in general". Examples of items from each component follow.

Teachers:

1. It is easy to get along with most teachers.
2. Teachers expect too much of pupils.

School Work:

1. Pupils have to keep reading and studying the same things over and over in school.
2. My daily school work is full of things that keep me interested.

Peers:

1. Most of the pupils in my class are friendly towards each other.
2. It is hard to make friends in school.

School in General:

1. Most pupils would be better off it they never went to school.
2. Most things about school are all right.

A 5 point response scale was used ranging from "Strongly Agree" to "Strongly Disagree". Approximately equal numbers of positively and negatively phrased items were used. The POQ was group administered by members of the project staff.

Academic Achievement

The academic achievement data consisted of grade equivalent scores averaged over the six components of the Stanford Achievement test. Alternate forms were used in the fall and spring administrations. The tests were administered by the classroom teachers.

Analyses

As already noted, a comparison such as $r_{att_1ach_2} > r_{ach_1att_2}$ could result not only from attitude influence increasing the correlation (designated by Yee and Gage as influence toward congruity) but also from achievement influence decreasing the correlation (designated by Yee and Gage as influence toward incongruity).[5] In general, both the source (attitudes or achivement) and direction (congruent or incongruent) of influence must be determined for meaningful interpretations to be made. The (FCP) analysis does this by classifying every pupil into one of four source by direction combinations. The procedure, as applied in the present case, was as follows:

1) Raw scores for male and female pupils' attitudes and achievement in both fall and spring were converted to standard scores. That is, $z=(x-\bar{x})/s$ was computed for every attitude and achievement score within each sex group.

2. For each student it was determined whether the cross-product of his posttest z scores was more positive or negative than the cross-product of his pretest z scores. If the cross-product of $z_{att_2}z_{ach_2}$ was algegraically greater than $z_{att_1}z_{ach_1}$, the direction of change was classed as congruent. If the reverse was the case the direction of change was classed as incongruent. That instances of congruent and incongruent change will, respectively, increase and decrease the overall attitude-achievement correlation is apparent from the defining formula for the product-moment coefficient:

$$r=\Sigma z_x z_y/N-1$$

3) The cross-lagged z products ($z_{att_1}z_{ach_2}$ and $z_{ach_1}z_{att_2}$) were examined for each attitude-achievement pair. When change was congruent, source of influence was determined as follows:

If $z_{att_1}z_{ach_2} > z_{ach_1}z_{att_2}$, then attitude was considered the source of influence.

If $z_{att_1}z_{ach_2} < z_{ach_1}z_{att_2}$, then achievement was considered the source of influence.

When change was incongruent, source of influence was determined as follows:

If $z_{att_1}z_{ach_2} > z_{ach_1}z_{att_2}$, then achievement was considered the source of influence.

If $z_{att_1}z_{ach_2} < z_{ach_1}z_{att_2}$, then attitude was considered the source of influence.

Chi square analyses were performed on the frequencies of the source of influence by direction of influence combinations to answer each of the following questions:

Q1: Do the four source by direction combinations occur with equal frequency?

Q2: Do attitudes and achievement as the source of influence occur with equal frequency?

Q3: Does change in congruent and incongruent directions occur with equal frequency?

The above analyses were done separately for males and females.

Results

Table 1 summarizes the analyses for female pupils. The left hand portion of the table presents the six correlations relavent to the cross-lagged panel correlational technique. The following characteristics of these analyses may be noted.

1) Each of the same occasion attitude-achievement correlations is

statistically significant, with attitudes toward school work providing the highest correlation followed by attitudes toward peers. The correlations of attitudes toward teachers and school in general with achievement are about equal in third place.

2) The correlation between attitudes toward teachers and achievement appears to have increased from fall to spring; those for the remaining attitude objects held constant.

3) With the exception of attitudes toward teachers, $r_{att_1ach_2} > r_{ach_1att_2}$, suggesting attitudes as the preponderant causal factor. Note however, that for these three attitude objects, even though the cross-lagged correlations are all positive, there is virtually no change in the correlations from fall to spring. This calls in question the suggestion of attitudes as preponderantly causal and suggests, as the FCP analyses will show, that something other than the two most plausible of the four alternative hypotheses is operating. In contrast, the two cross-lagged correlations are nearly equal in the case of attitudes toward teachers but with a sizeable increase in the correlation from fall to spring, suggesting that the reciprocal effects of attitudes toward teachers and achievement are preponderantly in a congruent direction.

The FCP analyses appear in the right hand portion of the table. They make explicit, and with considerable precision, the effects suggested by the correlation analyses.

1) Note that for each attitude object, $r_{att_1ach_2}$ vs. $r_{ach_1att_2}$ is compared with $(H_1 + H_4)$ vs. $(H_2 + H_3)$ of the FCP analysis. The inequalities within corresponding pairs are consistently in the same direction.

2) If there is no effect of attitudes on achievement or achievement on attitudes in either a congruent or incongruent direction then Q_1 should yield an insignificant chi square. For each attitude object these chi squares are highly significant.

3) If the effect of attitudes on achievement occurs with the same frequency as the effect of achievement on attitudes then Q_2 will yield insignificant chi squares. For each attitude object, these chi squares are also highly significant. But note that in each case achievement is the more frequent causal factor. Indeed, with the exception of attitudes toward teachers, achievement in an incongruent direction is the most frequent of the four alternatives. It is for this reason that the cross-lagged correlations for three of the attitude components could each be substantial but with no increase in the correlation from fall to spring.

4) If congruent and incongruent influence are equally frequent, Q_3 will yield an insignificant chi square. With the exception of attitudes toward teachers, the chi squares were insignificant, hence the lack of change in the same occasion correlations. In the case of attitudes toward teachers congruent influence was more frequent than incongruent influence for both attitude and achievement influence.

These results may now be reformulated and summarized as follows:

1) In the reciprocal effects between attitudes and achievement, achievement is much more frequently the causal factor but, except in the case of attitudes toward teachers, (among the attitude objects included in this study) those effects are in an incongruent direction i.e., they operate to lower the attitude-achievement correlation. Whether it is the case both that high achievement depresses attitudes and low achievement enhances attitudes or only one of these is the case will require still further analysis. It is an important question in the context of the present problem and it's formulation increases still

further the number of rival hypotheses lurking within the $r_{att_1ach_2}$ vs. $r_{ach_1att_2}$ inequality.

2) When attitudes are causal which is relatively infrequent, they are equally in a congruent and incongruent direction in the case of attitudes toward school work and peers but tend to be congruent in the case of attitudes toward teachers and school in general.

3) It is worth noting that among the four attitude objects, the preponderance of incongruent over congruent achievement influence was greatest in the case of attitudes towards school work.

Table 2 presents the analyses for males. The results may be summarized as follows:

1) The same occasion attitude-achievement correlations, while all positive, are slightly lower than those for females, seven of the eight being statistically significant. The order in magnitude of the correlations among the four attitude objects is the same as for females: school work being the highest, followed by peers, with teachers and school in general about equal in third place.

2) With the exception of the school in general component, the same occasion attitude-achievement correlations decreased from fall to spring.

3) In every case the cross-lagged correlations are positive with $r_{att_1ach_2} > r_{ach_1att_2}$. However, since the same occasion correlations either decrease or remain stable from fall to spring, we know that a straight forward interpretation of congruent attitude influence will be incorrect.

The FCP analyses in the right hand portion of Table 2 may be summarized as follows:

1) In every case $(H_1 + H_4) > (H_2 + H_3)$, consistent with the relative magnitudes of the corresponding cross-lagged correlations.

2) All four chi squares for Q_1 are highly significant indicating unequal frequencies of occurence among the four alternative hypotheses. The chi squares for Q_2 are also significant. Inspection of the frequencies shows that in the case of each attitude object achievement is the more frequent causal factor.

3) In every case incongruent achievement influence is the most frequent occurence. Again, this effect is most pronounced in the case of attitudes toward school work.

4) In those minority of instances in which attitudes are the source of influence the direction is more frequently congruent than incongruent.

5) The chi squares for Q_3 are nonsignificant in every case.

Thus, as with females, achievement is the preponderant causal factor in the reciprocal effects between attitudes and achievement and the direction of that influence is preponderantly incongruent. When attitudes are causal they tend to be in a congruent direction.

Discussion

From a methodological standpoint the present study shows the superiority of the FCP analysis over the cross-lagged panel correlation technique, even when results from the latter are considered within the context of all six correlation coefficients. In the present study the two methods yielded similar results but with the FCP analyses providing more information and with considerably more precision. The correlation analyses alone could not, e.g., have shown specifically the preponderance of incongruent achievement influence.

The same occasion attitude-achievement correlations were here more in line with the common sense assumption of a positive attitude-achievement relationship than the results of most previous studies have been. Such correlations may vary among the several possible attitudinal objects within the classroom setting.

The present study suggests some departure from prevalent notions regarding the particular attitudes that will correlate most highly with achievement. For example, attitudes toward peers correlated more highly with achievement than did attitudes toward teachers. Th s finding carries implications for theories of classroom teaching and learning. It has been noted elsewhere (Glick, 1968) that existing evidence does not support the popular belief of the centrality of the teacher-pupil relationship in classroom learning while, at the same time,. the potency of peer group processes and conditions on classroom learning has been relatively little recognized.

The FCP analyses suggest an explanation for the generally low attitude-achievement relationships reported in the literature. Attitudes operate to increase the correlation while achievement decreases it, the two thus canceling each other out to yield near zero correlations.

That achievement influence was, more frequently than not, in an incongruent direction, i.e., it usually operated to lower the attitude-achievement correlation, is a sobering fact, particularly since the finding for both male and female pupils was most pronounced in the case of attitudes toward school work. Further analyses are needed to determine whether either or both of the following processes are responsible for the effect: 1) The enhancement of attitudes on the part of those students whose achievement was relatively poor and/or 2) the depressing of attitudes on the part of those students whose achievement was relatively good. With regard to the latter possibility, might it be that the behaviors required for academic success, or the teaching and administrative processes surrounding them, frequently result in disaffection for the learning tasks and situation? Perhaps what is involved is reflected in a recently quoted statement by Lois Benson, head counselor in one of Seattle's high schools:

"Many pupils are trying to force themselves through high school and maintain a certain grade point--and hate it" (Anderson, 1969, p.6). Such a phenomenon is obviously contrary to educational values.

The FCP analyses give little cause for satisfaction to either the mental health and guidance oriented educators or the instructional technologists in their claims for attitudes or achievement respectively being the primary antecedent in the attitude-achievement relationship. Achievement is more frequently the causal factor but it usually operates to lower the attitude-achievement relationship. When attitudes are the source of influence, it more frequently raises than lowers the attitude-achievement correlation. However, attitude influence is relatively infrequent. Further research is needed to 1) identify the conditions and nature of the processes by which either attitudes or achievement become the source of influence and 2) identify the conditions and nature of the processes by which the effects are either congruent or incongruent. Additional research should also determine the generality of the results found here. For example, does the same pattern characterize all grade levels? If not, at what point does it emerge? Does it perhaps become more pronounced with successive grade levels?

Finally, the present study carries implications for both the substance and methodology of evaluation of educational programs. Increased academic achievement alone is not a sufficient basis for the acceptability of an educational procedure or program. Academic success must be accompanied by changes in appreciation and value for that which is learned and/or the process of learning. It would seem that one requirement of an acceptable educational program could be that the reciprocal influences of school orientations and achievement be congruent. Particularly, incongruent achievement influence on school orientations should be very infrequent in a "good" educational program.

Footnotes

[1]Presented at the Annual Convention of the Western Psychological Association, Vancouver, B.C., 1969. This research was supported in part by a Mental Health Project Grant, #535, National Institute of Mental Health. Appreciation is expressed to David Vinge for computer programming and processing and to Quentin Isely for his assistance in the analysis of data.

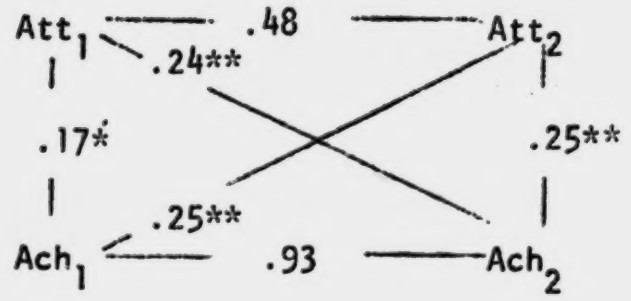
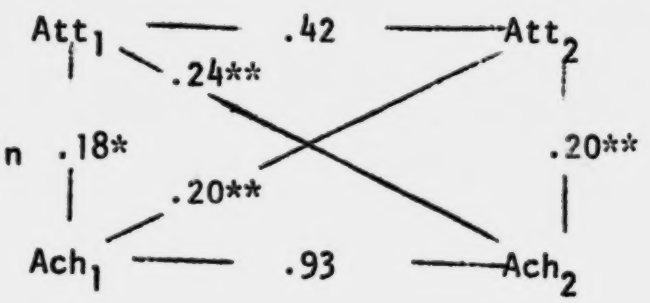
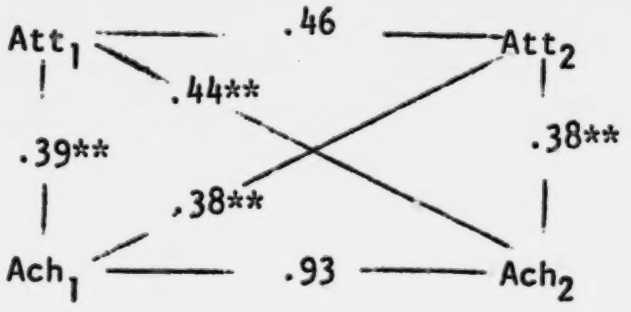
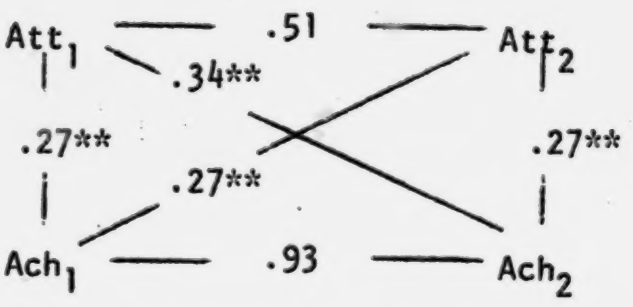
[2]The Kansas City School Behavior Project, Paul H. Bowman, Director.

[3]SES classifications of schools were based on the judgments of Central Office personnel of the Kansas City Missouri school district, using 1960 census data and a survey conducted by the YMCA.

[4]The development of the POQ was under the direction of Paul Bowman, Project Director, and Larry Havlicek, Director of Research. Intercorrelations among the components ranged from .29 to .81 for five randomly selected classrooms. October to May test-retest correlations of total scores within the same five classrooms ranged from .39 to .75 with an average r of .73. Total scores discriminated ($p<.001$) between both boys and girls nominated by their teachers as having the "best" and "worst" attitudes toward school.

[5]Cross-lagged correlations and gain scores have been criticized alike recently for their failure to take initial standing on a variable into account. The FCP technique appears vulnerable to the same criticism. Bohrnstedt, George W. "Observations on the measurement of change" in Sociological Methodology, Edgar F. Borgatta (Ed.). Jossey-Bass Inc., 1969.

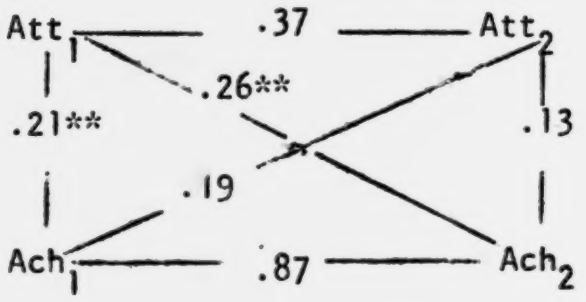
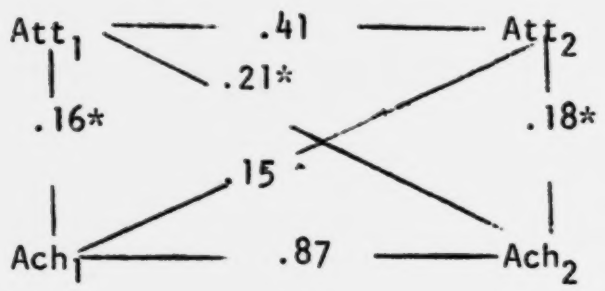
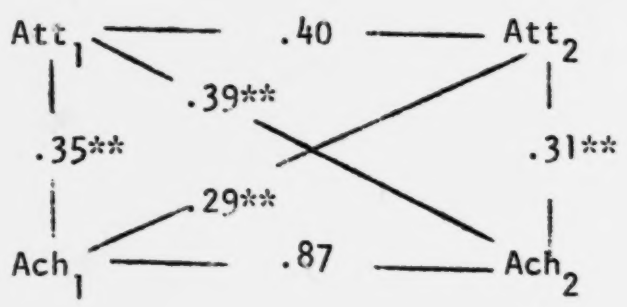
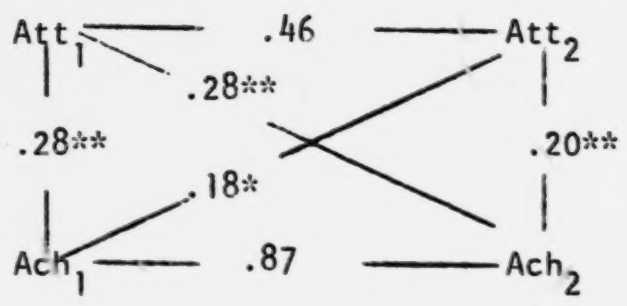
Table 1, Analyses of attitude-achievement interdependencies for females.

Attitude Objects	Same occasion, test-retest and cross-lagged correlations N = 199	FCP Analysis Competing Hypotheses
Teachers		$\frac{H_1}{(32} + \frac{H_4}{65) < \frac{H_3}{(82} + \frac{H_2}{20)}$ .24 < .25 $Q_1: \chi^2 = 49.70, p<.001$ $Q_2: \chi^2 = 45.35, p<.001$ $Q_3: \chi^2 = 4.23, p<.05$
School in General		$\frac{H_1}{(32} + \frac{H_4}{75) > \frac{H_3}{(67} + \frac{H_2}{25)}$ .24 > .20 $Q_1: \chi^2 = 37.24, p<.001$ $Q_2: \chi^2 = 36.30, p<.001$ $Q_3: \chi^2 = .01$, ns
School Work		$\frac{H_1}{(32} + \frac{H_4}{78) > \frac{H_3}{(57} + \frac{H_2}{32)}$ .44 > .38 $Q_1: \chi^2 = 29.76, p<.001$ $Q_2: \chi^2 = 25.33, p<.001$ $Q_3: \chi^2 = 2.22$, ns
Peers		$\frac{H_1}{(33} + \frac{H_4}{71) > \frac{H_3}{(63} + \frac{H_2}{32)}$ .34 > .27 $Q_1: \chi^2 = 24.58, p<.001$ $Q_2: \chi^2 = 23.92, p<.001$ $Q_3: \chi^2 = .25$, ns

* p<.05
** p<.01

H_1: Congruent attitude influence
H_2: Incongruent attitude influence
H_3: Congruent achievement influence
H_4: Incongruent achievement influence

Table 2. Analyses of attitude-achievement interdependencies for males.

Attitude Object	Same occasion, test-retest, and cross-lagged correlations	FCP Analysis Competing Hypotheses
Teachers	N = 159 	$\frac{H_1}{(32} + \frac{H_4}{57)} > \frac{H_3}{(52} + \frac{H_2}{18)}$ .26> .19 $Q_1: \chi^2 = 24.67$, $p<.001$ $Q_2: \chi^2 = 21.89$, $p<.001$ $Q_3: \chi^2 = .51$, ns
School in General		$\frac{H_1}{(29} + \frac{H_4}{60)} > \frac{H_3}{(53} + \frac{H_2}{17)}$ .21 >.15 $Q_1: \chi^2 = 30.66$, $p<.001$ $Q_2: \chi^2 = 28.23$, $p<.001$ $Q_3: \chi^2 = .16$, ns
School Work		$\frac{H_1}{(29} + \frac{H_4}{64)} > \frac{H_3}{(47} + \frac{H_2}{18)}$ .39 >.29 $Q_1: \chi^2 = 30.92$, $p<.001$ $Q_2: \chi^2 = 25.77$, $p<.001$ $Q_3: \chi^2 = .23$, ns
Peers		$\frac{H_1}{(24} + \frac{H_4}{62)} > \frac{H_3}{(53} + \frac{H_2}{20)}$ .28> .18 $Q_1: \chi^2 = 32.92$, $p<.001$ $Q_2: \chi^2 = 31.70$, $p<.001$ $Q_3: \chi^2 = .16$, ns

* $p<.05$
** $p<.01$

H_1: Congruent attitude influence
H_2: Incongruent attitude influence
H_3: Congruent achievement influence
H_4: Incongruent achievement influence

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